

SARDAR PATEL UNIVERSITY
Programme & Subject: M.Sc (Physics)
Semester: IV
Syllabus with Effect from: June - 2014

Paper Code: PS04EPHY01	Total Credit: 4
Title Of Paper: Applied Crystallography & Bio - Physics	

Unit	Description in detail	Weightage (%)
I	Laue method, Rotation method, Oscillation method, Weissenberg method, Precession method, Debye Scherrer Powder method, Powder diffractometry, Application of Xray Diffraction methods.	25%
II	Measurement of integrated intensity- factors affecting the intensity of diffraction, Determination of lattice parameter: Indexing cubic and Non-cubic structure – Analytical & Graphical Method, Diffraction under non-ideal condition Determination of particle size; Stress and Texture analysis , Accurate determination of lattice parameter for polycrystalline materials.	25%
III	Single crystal X-ray diffractometry, Intensity data collection from single crystal specimen, Normalized structure factor – Wilson plot, Primary & secondary extinction, systematic absences and determination of space group from intensity data. Violation of Friedel’s law, Fourier method in structure determination – estimation of relative phases. Refinement of molecular structure and interpretation of the results. Protein – primary, secondary and tertiary structure , Protein –Protein and Protein – ligand interaction, Bonds of Protein, Organization of nucleic acid - Primary, secondary, tertiary structure of DNA, Structure of RNA, Crystallization of protein – few general methods of crystallization – vapor diffusion and micro techniques.	25%
IV	Solid State Biophysics – an introduction, Application of delocalization in Bio-molecules, Proteins: Myoglobin and Hemoglobin molecules, other electronic properties of Proteins, enzyme studies, Photosynthesis, Carcinogenic activity, use of fluorescence spectroscopy, infrared spectroscopy, Raman Spectroscopy, NMR applications in biochemistry, biophysics and in medicine .	25%

Basic Text & Reference Books:-

- Elements of X-Ray diffraction – B. D. Cullity
- An introduction to X-ray Crystallography –M. M. Woolfson
- Contemporary Crystallography –M. J. Buerger
- Elementary Solid State Physics – Ali Omar
- Elements of Solid State Physics – J. P. Srivastava
- Biophysics – Vasantha Pattabhi, N. Gautham
- Bio-Physics, Principles and techniques: M. A Subramanian

